ZOÖLOGY.

Biogeographical Regions. — A valuable contribution to biogeography has recently been published by Jacobi.[1] The author has accepted the modern views on geographical distribution, and especially the fundamental idea that the present distribution does not correspond, in many cases, to the present conditions of life, but has often its origin in the past, and indicates conditions prevailing in former geological periods. He points out that the best zoögeographical divisions proposed by previous authors have not covered all cases, and cannot do so, because the past conditions were often directly the opposite to the present ones. Nevertheless, he tries to give a scheme that is intended to unite past and present conditions,[2] and selects Lydekker's division in three realms (Arktogæa, Neogæa, and Notogæa) as the most appropriate, since he believes that it *accounts best for the distribution of mammals and birds from the beginning of Tertiary times.*

Aside from the question whether it is necessary at all to have any biogeographical realms or regions, we cannot agree with this idea that biogeography ought to unite past and present conditions into *one* scheme; indeed, in many cases it is directly impossible to do so, since we do not see any way to reconcile connection and disconnection. And in most cases it would amount just to this, to bring under one head certain parts of the earth's surface which are now connected, while they were formerly disconnected, — or *vice versa*. Believing this to be an impossible task, we have always advocated another method of investigation, namely, the attempt to establish the present conditions of life (not the actual distribution of animals or plants) and to divide the earth into regions accordingly. These regions refer only to the *present* time, and by comparing this scheme with the actual distribution of animals, those cases which do not agree with it are at once revealed. This method calls our attention to those facts in distribution which need special investigation and explanation, and in most cases we shall be able to account for them

[1] Jacobi, A. Lage und Form biogeographischer Gebiete, *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, Bd. xxxv, Heft 3 (1900), pp. 147–238. 2 pls.

[2] The same idea has been advocated by Prof. H. F. Osborn (*Science*, April 13, 1900, p. 563), who says: "This, then, is our problem, to connect living distribution with distribution in past time and to propose a system which will be in harmony with both sets of facts."

by supposed changes in the conditions of life that have taken place during the earth's history.

The investigation of instances of the latter kind forms a large part in Jacobi's paper, and he has collected valuable material which tends to show that certain parts of the earth's surface, in their fauna and flora, possess a uniformity which is inexplicable by the present conditions. He calls those parts "areas of dispersal" (*Ausbreitungsgebiete*) and indicates them on his map (Pl. VII). There are fifteen of them :

1. Greenlandian.	6. Arabian.	11. Philippinian.
2. Lusitanian.	7. Indo-African.	12. Southern Japanese.
3. Mediterranean.	8. Antarctic.	13. Siberian.
4. Sarmatian.	9. Papuan.	14. Beringian.
5. Iranian.	10. Farther Indian.	15. Central-American.

Of these, the 4th (southern Russia and Turkestan), the 5th (Persia), the 10th (Farther India), and the 15th (Central America) are situated on continents and do not present any remarkable features, since they are not opposed to the present conditions.

The 2d, connecting England with western France and Spain, the 3d, connecting the Mediterranean countries, the 9th, connecting New Guinea with Australia, the 11th, connecting the Philippine Islands with each other and with Formosa, the 12th, connecting South Japan with Korea and China, the 13th, connecting North Japan with Siberia, and the 14th, connecting Siberia and Alaska, are well known and have been generally accepted as well established.

The chief interest centers in the remaining areas of dispersal, namely, the 1st (connection of East Greenland with Spitzbergen, Norway, and Scotland), the 6th and 7th (connection of East Africa and India, partly by way of Abyssinia and Arabia, partly by way of Madagascar and the islands of the Indian Ocean), and the 8th (connection of South Africa, Australia, New Zealand, and South America with Antarctica). Indeed, none of these connections is new to science, and some of them have been repeatedly discussed lately, but it is interesting that Jacobi's studies have led him also to the assumption of the former existence of these very important biogeographical relations, which can only be explained by the theory of a former connection of the respective parts by land. In the demonstration that such conditions must have existed in former times, and in the collection of known facts as well as introduction of new ones, which tend to support this assumption, lies the chief value of

this paper, and thus it will be of great use to any one who proposes to study these highly interesting zoögeographical questions.

A. E. O.

The Apogonoid Fishes of Japan. — Jordan and Snyder continue their monographic reviews of the various groups of Japanese fishes with an account of the cardinal fishes, or Apogonidæ. Seventeen species are described, most of them being figured. Six of these are new, one new genus, Telescopias, being recognized. The authors have overlooked the fact that Dr. Günther has substituted the generic name of Synagrops for Melanostoma, which is preoccupied. D. S. J.

Jenkins on Hawaiian Fishes. — In the *Bulletin of the United States Fish Commission*, Dr. O. P. Jenkins continues his studies of the very rich collection of Hawaiian fishes made by him in the summer of 1889. Fifteen species are described and figured as new: *Sphyræna helleri*, *Sphyræna snodgrassi*, *Anthias fuscipinnis*, *Aphareus flavivultus*, *Eupomacentrus marginatus*, *Chromis velox*, *Chætodon mantelliger*, *Chætodon sphenospilus*, *Ostracion camurum*, *Ovoides latifrons*, *Tropidichthys jactator*, *Eumycterias bitæniatus*, *Scorpænopsis cacopsis*, *Parapercis notostigma*, *Brotula marginalis*. Later investigations of the Hawaiian Commission, of which Dr. Jenkins is a member, show that *Chætodon mantelliger* is the original *Chætodon miliaris* of Quoy and Gaimard; *Parapercis notostigma* has been recently and earlier described as *Percis schauinslandi* by Steindachner.

D. S. J.

Seale on Hawaiian Fishes. — In an "Occasional Paper of the Bernice Pauahi Bishop Museum of Polynesian Ethnology and Natural History," Mr. Alvin Seale, curator of ichthyology, describes six new species of fishes from Honolulu, illustrating them with photographs of the type specimens.

These species are: *Epinephelus quernus*, *Novaculichthys tattoo*, *Serranus brighami*, *Balistes fuscolineatus*, *Monocanthus albopunctatus*, *Thalassoma bernuti* (misprinted "berendto").

Of these the *Serranus brighami* seems to be related rather to Etelis than to Serranus.

D. S. J.

Starks on the Synonymy of the Fish Skeleton. — In the *Proceedings of the Washington Academy of Sciences*, Mr. Edwin Chapin Starks gives a comparative study of the names applied to the bones of fishes. This will prove a great convenience to students